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ABSTRACT

A test was made of the hypothesis that only immediate supervisors know enough about their subordinates' job activities to render job performance ratings. Pairs of supervisors who rated the quality of performance of 295 supply airmen had identified themselves as immediate supervisors and other-than-immediate supervisors. These pairs, working independently, rated the same airmen (job incumbents) on how well they performed individual tasks. Each supervisor was asked to rate each task that he was sure the subordinate did, but he was not told which tasks the subordinate had identified. The selections of tasks were tallied against the responses made by the incumbents on the same inventory. An incumbent's responses were relative time spent ratings. Tasks were classified by a scale of percent time spent, and two supervisory levels were compared in terms of percentage of tallies (agreements) with the incumbents. The tallies were greater for tasks on which the airmen spent more time, but there was no detectable difference between immediate and other supervisors. It was concluded that in the Inventory Management and Material Facilities career ladders, at least, it was possible to obtain other supervisors who were as familiar with their subordinates' jobs as immediate supervisors. (Author)

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AFHRL-TR-75-7

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AIR FORCE HUMAN RESOURCES LABORATORY

FAMILIARITY WITH SUBORDINATES' JOBS: IMMEDIATE VERSUS SECONDARY SUPERVISORS

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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By
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OCCUPATIONAL AND MANPOWER RESEARCH DIVISION
Lackland Air Force Base, Texas 78236

June 1975
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2

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PREFACE

This research was conducted under Project 7734, Development of Methods for Describing, Evaluating and Structuring Air Force Occupations; Task 773404, Development of Methods for Measuring Air Force Work Experience, Work Performance, and Work Potential.

Mr. Charles R. Rogers and Mr. James D. Souter overcame novel problems in scaling proportional task time in the process of programming the analysis of data.

TABLE OF CONTENTS

		Page
I.	Introduction	5
II.	Procedure	6
III.	Analyses and Results	6
IV.	Conclusions and Discussion	17
References		19

LIST OF ILLUSTRATIONS

Figure		Page
1	Percent Agreement of Supervisors with Inventory Management, 645X0, Personnel at all Levels on Tasks Performed	10
2	Percent Agreement of Supervisors with Materiel Facilities, 647X0, Personnel at all Levels on Tasks Performed	11
3	Percent Agreement of Supervisors with Lower Level Inventory Management Personnel, 64530 and 64550, on Tasks Performed	12
4	Percent Agreement of Supervisors with Upper Level Inventory Management Personnel, 64570 and 64590, on Tasks Performed	13
5	Percent Agreement of Supervisors with Lower Level Materiel Facilities Personnel, 64730 and 64750, on Tasks Performed	15
6	Percent Agreement of Supervisors with Upper Level Materiel Facilities Personnel, 64770 and 64790, on Tasks Performed	16

LIST OF TABLES

Table		Page
1	Frequencies Within the 15 Intervals of Percent Time Spent on Tasks	7
2	Supervisor-Incumbent Agreement on Tasks Performed, Both Ladders	8
3	Supervisor-Incumbent Agreement on Tasks Performed, Inventory Management, 645X0	9
4	Totals of Supervisor-Incumbent Agreement on Tasks Performed, By Career Ladder and Skill Level	14
5	Supervisor-Incumbent Agreement That Tasks Were Not Performed	18

FAMILIARITY WITH SUBORDINATES' JOBS: IMMEDIATE VERSUS SECONDARY SUPERVISORS

I. INTRODUCTION

Supervisor knowledge of a subordinate's job assumes practical importance if one seeks valid estimates of job performance. Presumably, the closer a supervisor is to his subordinate, physically and temporally, the more he ought to know about his subordinate's job. This means that an "immediate" supervisor should be more familiar with the activities of a job incumbent than any other supervisor of that individual. Must one always acquire job performance ratings from immediate supervisors, and immediate supervisors only? There are organizational and geographical factors which make it nearly impossible to fulfill such a requirement. Would this mean that some areas of job performance cannot be satisfactorily investigated?

The present study compares the knowledge shown by immediate supervisors with that shown by other than immediate supervisors concerning tasks performed by their mutual subordinates. A finding that there is substantial difference between the two levels of supervisory knowledge of a worker's activities could change the design for data collection in some occupational research studies.

Experience has shown that one can rely on a job incumbent to provide an honest statement of the relative time he spends on tasks. Investigations that have been made on job inventory responses indicate that they are not only honest but also reasonably accurate. However, very little research has been directed toward determining what supervisors know about how subordinates spend their time on the job. Madden, Hazel, and Christal reported a study in 1964, in which they compared tasks checked as performed by incumbents with corresponding estimates by their supervisors. A 57% agreement was obtained on tasks mutually checked, and a 48% agreement was achieved when relative time spent was considered. However, that study used only immediate supervisors.

It should be made clear that the present study is not concerned with the absolute amount of knowledge that either supervisor possessed about a subordinate's job. Two levels of supervisor were asked to make ratings on the quality of performance of individual tasks. Their instruction was to rate only on the tasks they were sure that their subordinates were performing. Thus, supervisors were free to omit ratings on tasks which their subordinates could be performing, but which the supervisor was not in a position to observe. While the Madden *et al.* study involved collection of data from incumbents and supervisors at the same time, the present study introduced a lag between incumbent responses and supervisors' ratings that in some instances was as great as two months.

Why should a supervisor fail to rate a subordinate on the performance of a task? Some possible reasons are:

1. The incumbent used to do the task but no longer did it. His job had changed during the interim between inventory and rating.

2. The task was such a small part of the incumbent's job that his supervisor doubted the legitimacy of its inclusion.

3. The supervisor knew more about the meaning of the task statement than the incumbent, and knew that the statement called for more than the incumbent performed. For example, an incumbent sergeant checked that he reviewed budgets; this could be so if looking for mistakes in arithmetic and misspelled words was all that there was to reviewing a budget, but not correct if reviewed meant evaluated.

4. The supervisor was aware that the incumbent did the task, but considered that his observation was insufficient to rate performance.

5. The supervisor really didn't know that the airman performed the task.

6. The supervisor knew that the incumbent performed the task but did not feel qualified to judge the performance. Only the fifth, of the six listed items, reflects lack of knowledge of the incumbent's activities, yet any of them could result in "disagreement." It can be seen from the foregoing that the data of this study permit no conclusions about "real" knowledge on the part of the supervisor, but that the study still permits comparison of two levels of supervisor in a relative sense, using the incumbents' job inventories as the standard.

II. PROCEDURE

Airmen at all skill levels in the Inventory Management, DAFSC 645X0, and Materiel Facilities, DAFSC 647X0, career ladders completed a regular job inventory which contained tasks of both ladders in a single booklet. Respondent data were collected in continental United States, Alaska, and three overseas bases. Upon return of completed inventories, lists of selected respondents were sent to the bases of origin. These airmen were rated by two supervisors, an immediate and an other-than-immediate supervisor who was acquainted with the airman and his job performance. Raters received two sets of rating materials to be executed in the following sequence: (*a*) overall performance rating, then ratings on 65 traits; (*b*) an inventory which required ratings on tasks that the supervisor was sure his subordinate performed and ratings on the ability to learn all the tasks in the inventory, including those tasks he was already performing. The supervisor was asked to rate each task on the incumbent's comparative performance with other airmen who also did the task. For the analyses of this study, the standard for comparison was the set of relative time spent ratings made by an incumbent with respect to tasks he performed in his job.

At this point consider only that an incumbent had shown some of his time spent on a specific task. If an immediate supervisor elected to rate an incumbent's performance on that task a tally was given: *1*. If the other supervisor also rated him on the same task, a double tally was given: *11*. If the immediate supervisor did not rate the incumbent on the task which the incumbent had marked, a null was given: *0*. If the other supervisor had marked the task in question the tally would be: *01*. The total possible combinations are: *11*, *01*, *10*, and *00*. Tally pairs were collected into categories based on time spent on tasks for the purpose of comparing the "agreements" of the two levels of supervisor, which permitted time spent gradations. There is also the set of "agreements" on tasks not performed, that is, on tasks not marked by the incumbent. For these tasks there are also four tally combinations of "agreement," but not time spent gradations.

The number of sets of ratings with both an immediate and an other-than-immediate supervisor was 295, which were the only cases retained for the analyses. The number of ratees by skill level is as follows: Inventory Management – 64530, 25; 64550, 93; 64570, 58; 64590, 15; Materiel Facilities – 64730, 12; 64750, 56; 64770, 31; 64790, 5.

Supervisors of the 295 incumbents were a heterogeneous sampling, ranging from "blue collar" workers to higher ranking officers and civilians. The scarcity of incumbents in the 64X90 level was due both to actual low manning and to the difficulty in obtaining immediate supervisor ratings. The scarcity of apprentices, 64X30s, was a normal function of length of time on the job prior to being asked to complete a job inventory. Varying amounts of time elapsed between return of the incumbent's inventory and his rating by supervisors; this was an uncontrollable factor which varied from base to base.

III. ANALYSES AND RESULTS

The standard Comprehensive Occupational Data Analysis Programs (CODAP) (Christal, 1972) convert an incumbent's responses to percent time spent on each task. These percent time spent values were assigned to a 15 interval scale, as presented in Table 1. The number of scale intervals of Table 1 was first established on an empirical basis, having been derived from the CODAP data of the study, then converted to an arbitrary scale whose intervals followed a systematic progression. Since many incumbents performed the same task, and the specific time spent on a particular task was a function of all the tasks an incumbent performed, a task might appear in any of the intervals of Table 1. This table is designed to show how the 15-interval scale was generated to accomodate the extreme skewness of the distribution of percent-time-spent values arising from the analysis of ordinary job inventory responses. Note from the *Interval Range* and *Step* columns of Table 1 that the steps become progressively larger. The frequency of tasks at a specific interval is given in the column headed *Number of Tasks Occurring*. A count of the different contributors is given in the column *Incumbent Contributors Performing the Tasks*. This column is not additive because the total number of *different* contributors is the number of incumbents in the study, 295. The 15 interval scale was left with two vacant intervals of very small percent time spent. There are some jobs in the Air Force with so many tasks that small fractional percents are needed, and thus this scale has general applicability for other studies.

Table 1. Frequencies Within the 15 Intervals of Percent Time Spent on Tasks

Interval	Interval Range in Percents	Step Size	Number of Tasks Occurring in the Interval	Number of Different Incumbent Contributors Performing the Tasks
01	000.001–000.049	.05	0	0
02	000.050–000.149	.10	1	0
03	000.150–000.349	.20	23	6
04	000.350–000.649	.30	187	38
05	000.650–001.049	.40	735	66
06	001.050–001.549	.50	1,001	81
07	001.550–002.149	.60	1,405	117
08	002.150–002.849	.70	1,242	124
09	002.850–003.649	.80	1,012	133
10	003.650–004.549	.90	510	110
11	004.550–005.549	1.00	383	85
12	005.550–007.549	2.00	561	117
13	007.550–011.549	4.00	399	98
14	011.550–019.549	8.00	227	68
15	019.550–100.000	–	100	39
Total			7,785	295

Matching supervisor and incumbent responses produced the data given in Table 2. Table 2 provides four kinds of agreement between the two levels of supervisor and incumbent. 00, 10, 01, 11. The columns designate the kind of agreement, the rows designate the time spent intervals. In addition, there is a totals column and an independent column giving the number of airmen who contributed the task data in each time spent interval. The agreement categories are mutually exclusive, which makes it possible to convert to percentages and to balance the percent sums. The tallies for either level of supervisor are the sum of tallies by his level and the tallies by both levels. The data of Table 2 have been broken down into career ladders, and then broken down into lower and upper skill level samples. The break-out results have been prepared in graphic form, and one of the tables from which the graphs were derived is presented as Table 3.

The analyses are simple distributions. When presented in graphic form the columns are summed to show the agreement on tasks performed for the two levels of supervisor. For example, Table 3, interval 05, shows 8.95 agreement under column *10* (other supervisor agrees), and 37.90 under column *11* (both supervisors agree), which totals 46.85. That value is found in the interval 05-06 of Figure 1 as the point 47% on the dashed line, which represents agreement by other than immediate supervisors. Trends which cannot be discerned from the tables are easily seen in the graphs. The last two rows of the tables (total tasks performed and number of incumbents providing the data) are given in the graphs and can be used to check correspondence between table and graph.

It was observed when half the figures were completed that successive intervals produced a consistent slope when the number of contributors was 20 or more. Instead of collapsing intervals to achieve sufficient contributors, vertical lines have been drawn on Figures 1 through 6 to indicate the span of intervals within which there were 20 or more contributors. The series of figures successively subdivides the data, first into career ladders, then into upper and lower level airmen within ladders. Each figure gives the percent agreement between immediate supervisors and incumbents (percent tallies by time spent intervals) as a solid line; corresponding data for other supervisors are dashed lines. There is no theoretical justification for connecting these points, but it has been done to aid the reader.

Figures 1 and 2 yield the essential finding of this study. With the aid of the solid and dashed lines it can be seen that these cross each other unsystematically, and that they follow the same upward progression from 40% agreement to 70%. There is no superiority of immediate supervisors over other supervisors in Figures 1 and 2. This finding cannot be attributed to the baseline used. In the development of the time spent scale data were first analyzed on a "scale" of irregular time intervals composed of nearly equal numbers of tasks producing an interval. Graphs similar to those presented here showed the same result as these, regardless of baseline.

Table 2. Supervisor-Incumbent Agreement on Task Performed, Both Ladders

	Interval	00 Neither Agrees	10 Other Supervisor Agrees	01 Immediate Supervisor Agrees	11 Both Agree	Total	Incumbents Providing the Data
03	000.150–000.349	9	3	6	5	23	6
	Row %	39.13	13.04	26.09	21.74	100.00	
04	000.350–000.649	96	26	20	45	187	38
	Row %	51.34	13.90	10.70	24.06	100.00	
05	000.650–001.049	354	68	87	226	735	66
	Row %	48.16	9.25	11.84	30.75	100.00	
06	001.050–001.549	328	147	152	374	1,001	81
	Row %	32.77	14.69	15.18	37.36	100.00	
07	001.550–002.149	483	238	198	486	1,405	117
	Row %	34.38	16.94	14.09	34.59	100.00	
08	002.150–002.849	368	188	154	532	1,242	124
	Row %	29.63	15.14	12.40	42.83	100.00	
09	002.850–003.649	253	127	146	486	1,012	133
	Row %	25.00	12.55	14.43	48.02	100.00	
10	003.650–004.549	110	63	77	260	510	110
	Row %	21.57	12.35	15.10	50.98	100.00	
11	004.550–005.549	87	38	56	202	383	85
	Row %	22.72	9.92	14.62	52.74	100.00	
12	005.550–007.549	144	70	89	258	561	117
	Row %	25.67	12.48	15.86	45.99	100.00	
13	007.550–011.549	102	52	54	191	399	98
	Row %	25.56	13.03	13.53	47.87	100.00	
14	011.550–019.549	40	23	31	133	227	68
	Row %	17.62	10.13	13.66	58.59	100.00	
15	019.550–up	16	19	13	52 100	39	
	Row %	16.00	19.00	13.00	52.00		
Total		2,390	1,062	1,083	3,250	7,785	295
Total	Row %	30.70	13.64	13.91	41.75	100.00	

Note.—The agreement columns are mutually exclusive. Example; in interval 05 the other supervisors actually agreed with incumbents that 68+226 tasks were performed, for a total of 294, or 40.00 percent.

Table 3. Supervisor-Incumbent Agreement on Tasks Performed, Inventory Management, 645X0

	Interval	00 Neither Agrees	10 Other Supervisor Agrees	01 Immediate Supervisor Agrees	11 Both agree	Total	Incumbents Providing the Data
03	000.150–000.349	2	3	1	5	11	3
	Row %	18.18	27.27	9.09	45.45	100.00	
04	000.350–000.649	55	11	15	33	114	26
	Row %	48.25	9.65	13.16	28.95	100.00	
05	000.650–001.049	212	47	67	199	525	43
	Row %	40.38	8.95	12.76	37.90	100.00	
06	001.050–001.549	197	79	108	260	644	53
	Row %	30.59	12.27	16.77	40.37	100.00	
07	001.550–002.149	296	141	129	306	872	77
	Row %	33.94	16.17	14.79	35.09	100.00	
08	002.150–002.849	285	122	114	349	810	79
	Row %	27.78	15.06	14.07	43.09	100.00	
09	002.850–003.649	180	65	99	257	601	86
	Row %	29.95	10.82	16.47	42.76	100.00	
10	003.650–004.549	71	42	42	101	256	60
	Row %	27.73	16.41	16.41	39.45	100.00	
11	004.550–005.549	60	22	31	134	247	56
	Row %	24.29	8.91	12.55	54.25	100.00	
12	005.550–007.549	91	46	54	136	327	72
	Row %	27.83	14.07	16.51	41.59	100.00	
13	007.550–011.549	68	36	32	120	256	65
	Row %	26.56	14.06	12.50	46.88	100.00	
14	011.550–019.549	34	15	21	82	152	46
	Row %	22.37	9.87	13.82	53.95	100.00	
15	019.550–up	11	14	10	42	77	30
	Row %	14.29	18.18	12.99	54.55	100.00	

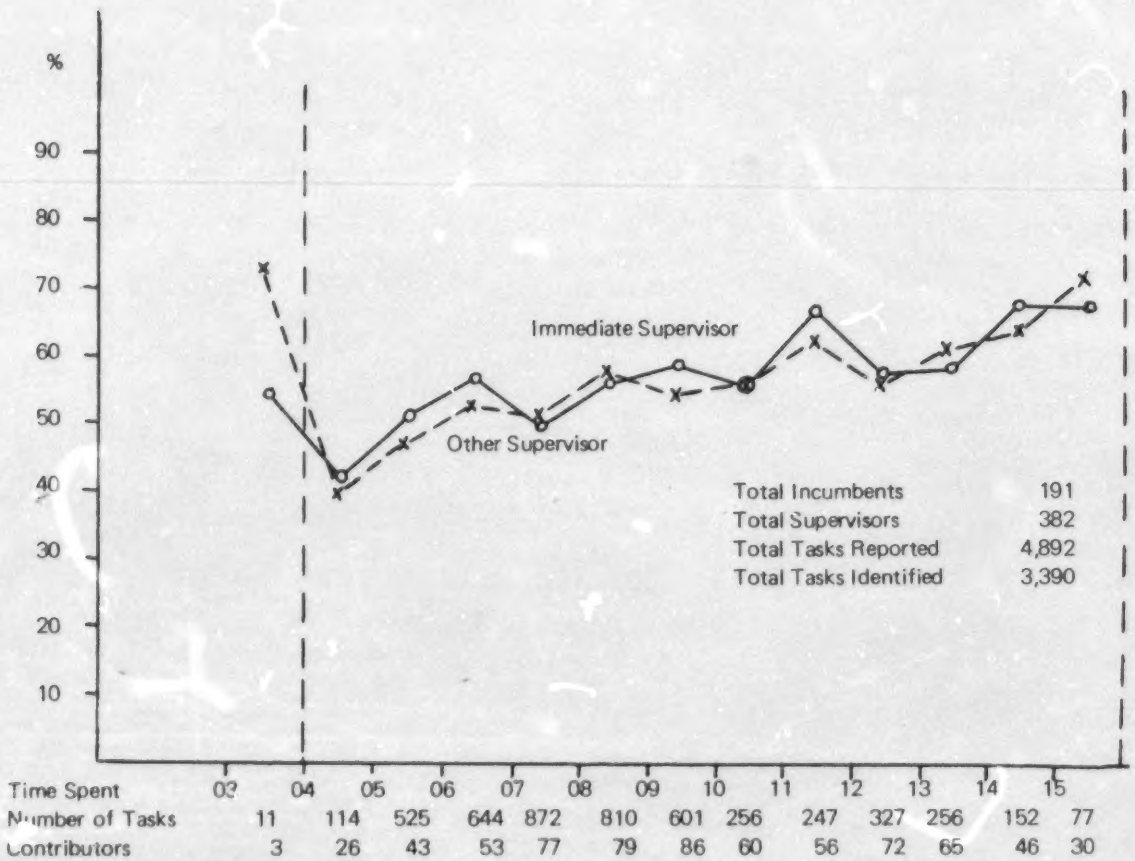

Figure 1. **Percent agreement of supervisors with inventory management, 645X0, personnel at all levels on tasks performed.**

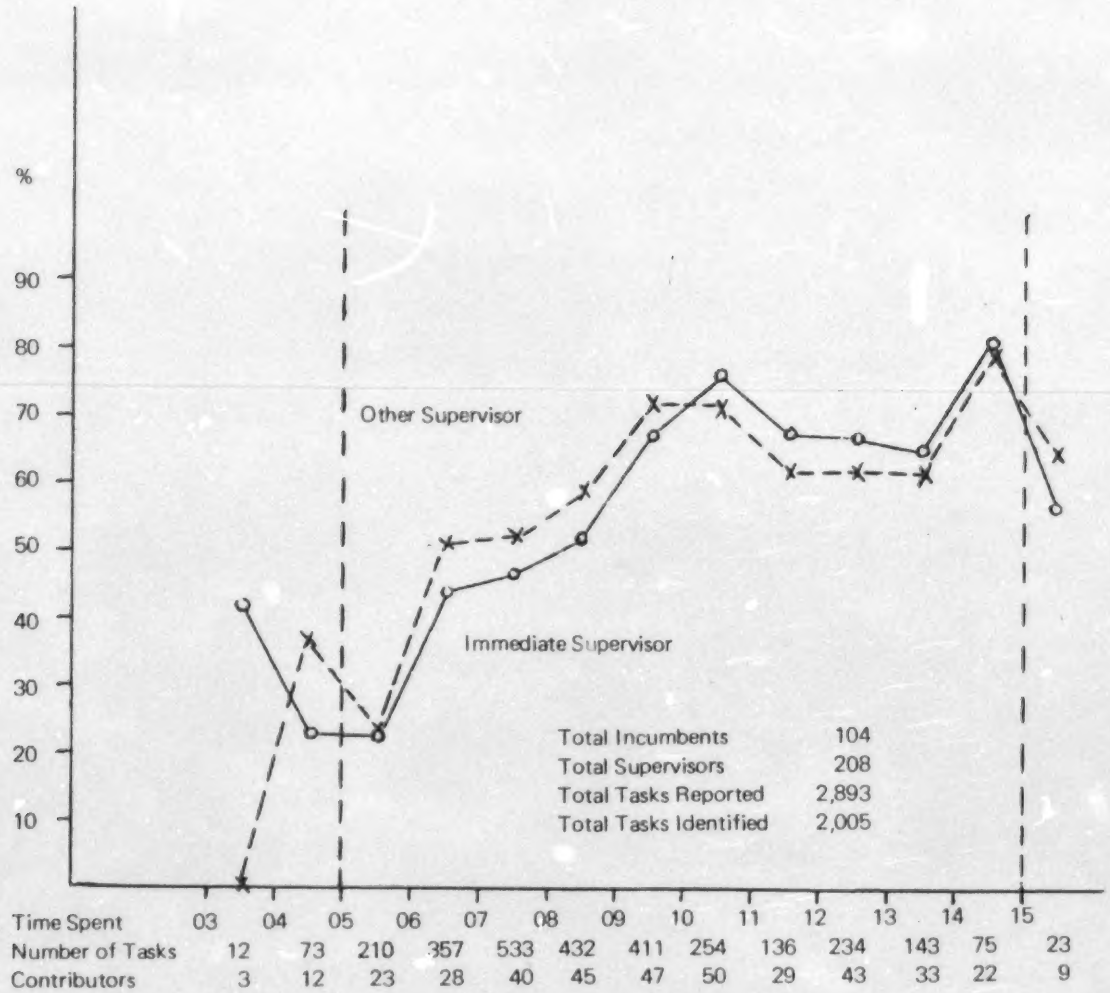

Figure 2. **Percent agreement of supervisors with materiel facilities, 647X0, personnel at all levels on tasks performed.**

The inventory management data have been broken out into lower and upper skill levels in Figures 3 and 4. What appeared to be a regular slope in Figure 1 is seen to have been mainly contributed by the lower skill level observations. Supervisors in both the immediate and other status failed to tally the tasks of lower level airmen on which small amounts of time were claimed, if one takes 50% tallying as a standard.

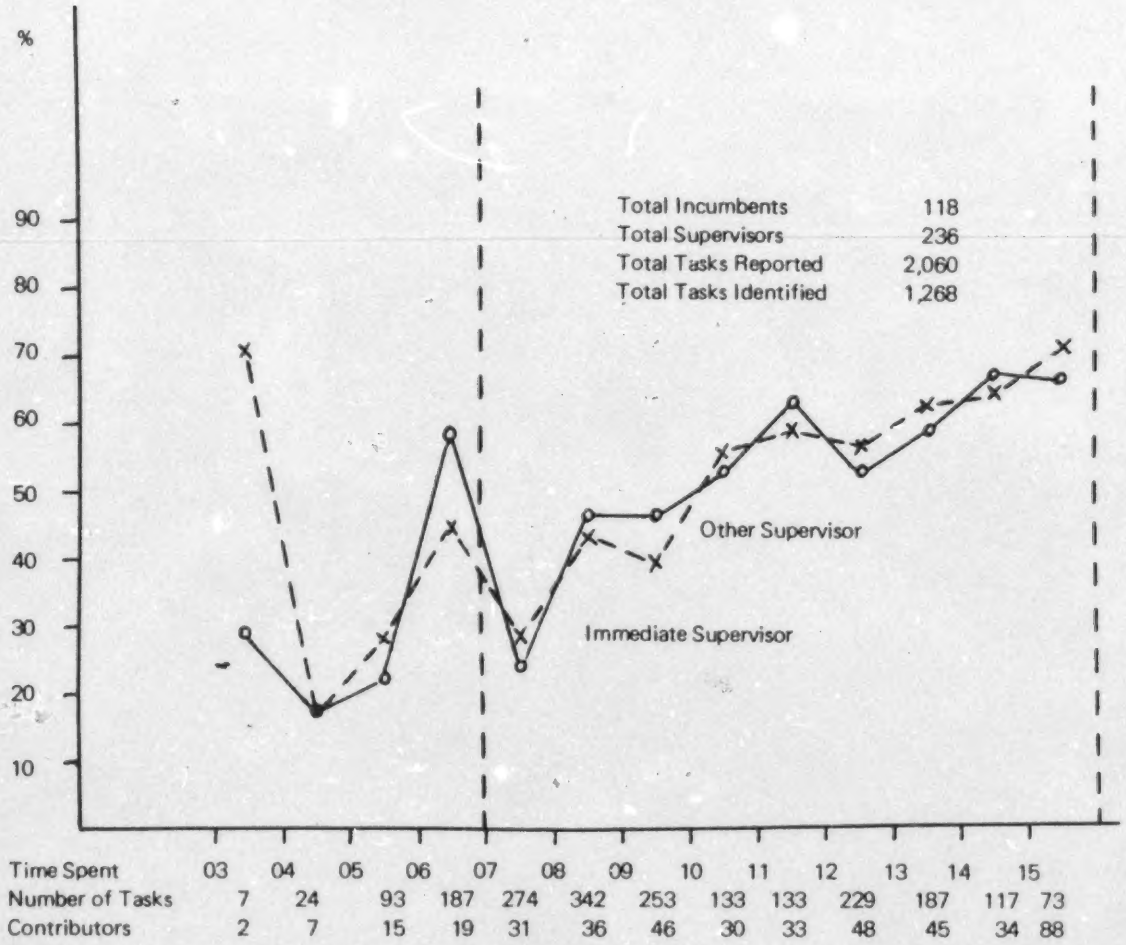

Figure 3. **Percent agreement of supervisors with lower level inventory management personnel, 64530 and 64550, on tasks performed.**

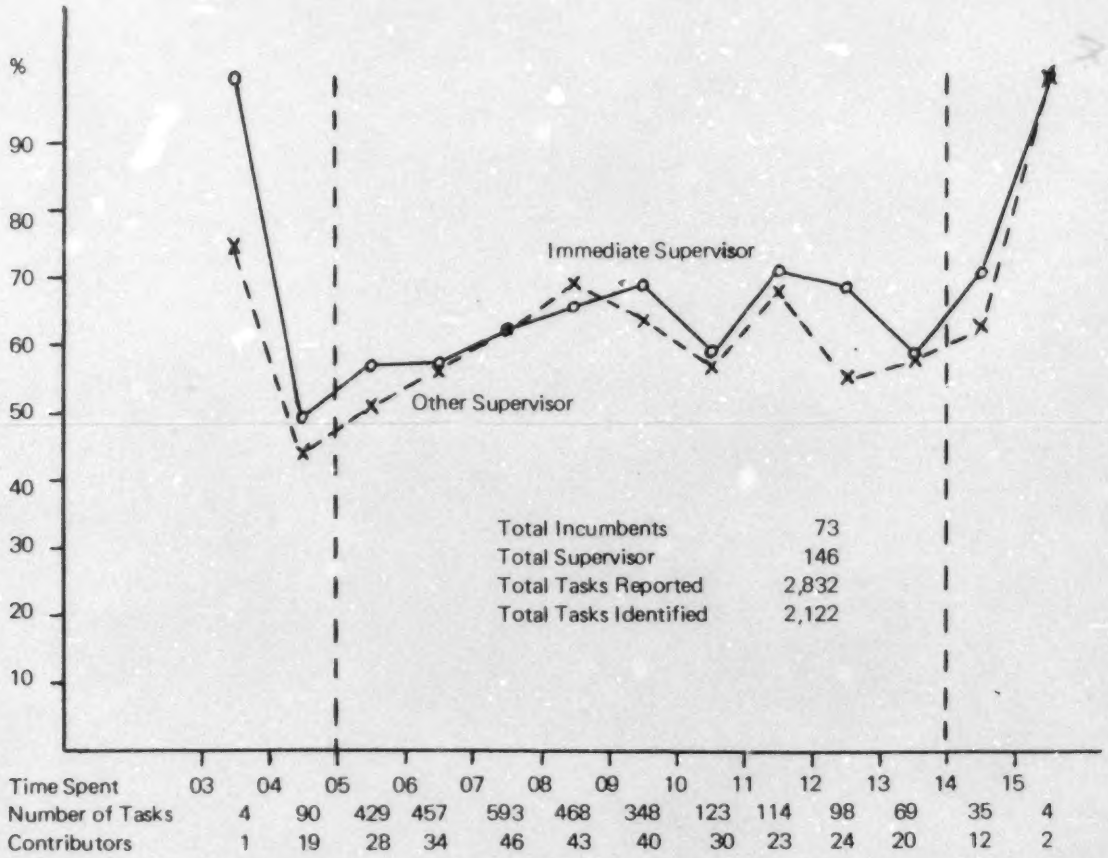

Figure 4. **Percent agreement of supervisors with upper level inventory management personnel, 64570 and 64590, on tasks performed.**

The materiel facilities data of Figure 2 have been broken out into lower and upper skill levels in Figures 5 and 6. Although the number of higher level materiel facilities personnel is too small to provide stable data, the tally level tends to exceed 50%. In general, the Materiel Facilities supervisors appear to tally on a greater percentage of their subordinates' tasks than do the supervisors in Inventory Management.

The data of Table 3 and tables not shown, from which graphs were drawn to make Figures 1 through 6, have been summed to form Table 4, and to show supervisor-incumbent agreement on tasks performed without using time spent values. Collapsed in this fashion, the data reveal that the poorest supervisor-incumbent agreement occurred for the lower level Inventory Management sample.

Table 4. Totals of Supervisor-Incumbent Agreement on Tasks Performed, by Career Ladder and Skill Level

Sample	00 Neither Agrees	10 Other Supervisor Agrees	01 Immediate Supervisor Agrees	11 Both Agree	Total	Incumbents Providing the Data
Inventory Management, 645X0	1,502	643	723	2,024	4,892	191
Row %	30.70	13.14	14.78	41.37	100.00	
Materiel Facilities, 647X0	888	419	360	1,226	2,893	104
Row %	30.69	14.48	12.44	42.38	100.00	
Lower Level Inventory Management, 64530+64550	792	277	301	690	2,060	118
Row %	38.45	13.45	14.61	33.50	100.00	
Upper Level Inventory Management, 64570+64590	710	366	422	1,334	2,832	73
Row %	25.07	12.92	14.90	47.10	100.00	
Lower Level Materiel Facilities, 64730+64750	627	181	208	611	1,627	68
Row %	38.54	11.12	12.78	37.55	100.00	
Upper Level Materiel Facilities, 64770+64790	261	238	152	615	1,266	36
Row %	20.62	18.80	12.01	48.58	100.00	

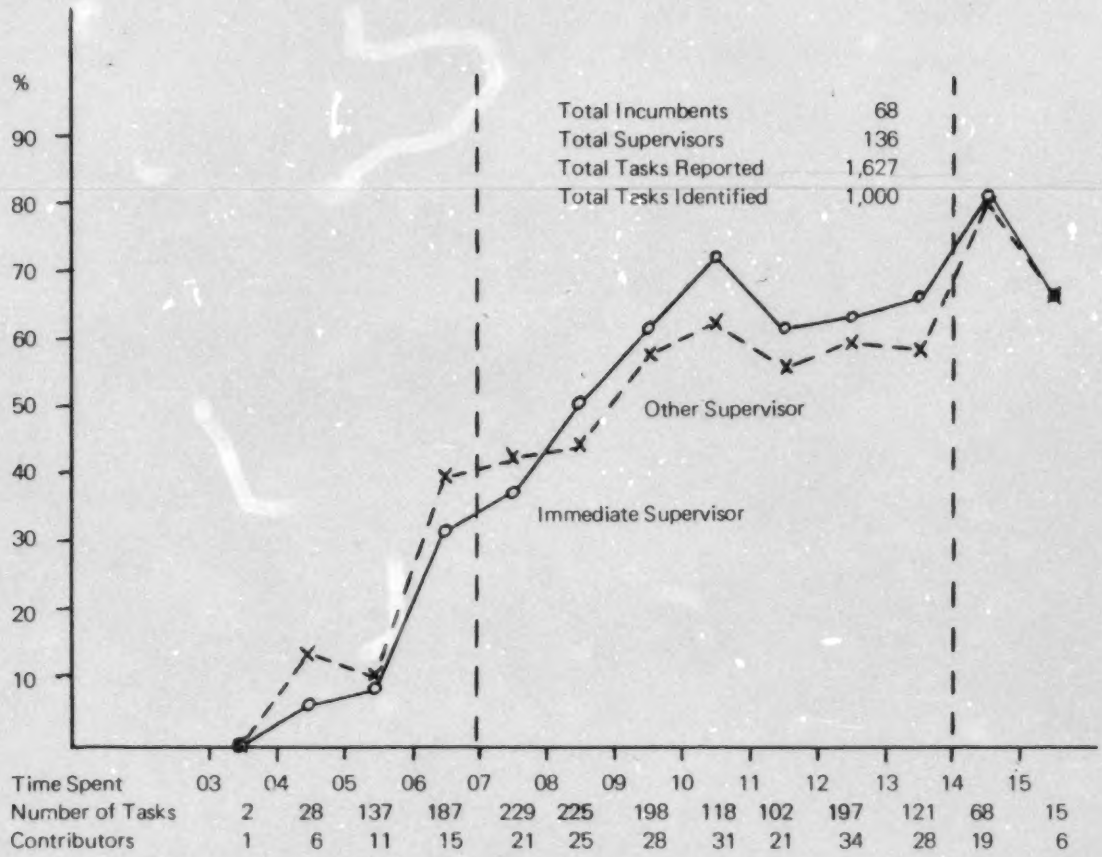

Figure 5. **Percent agreement of supervisors with lower level materiel facilities personnel, 64730 and 64750, on tasks performed.**

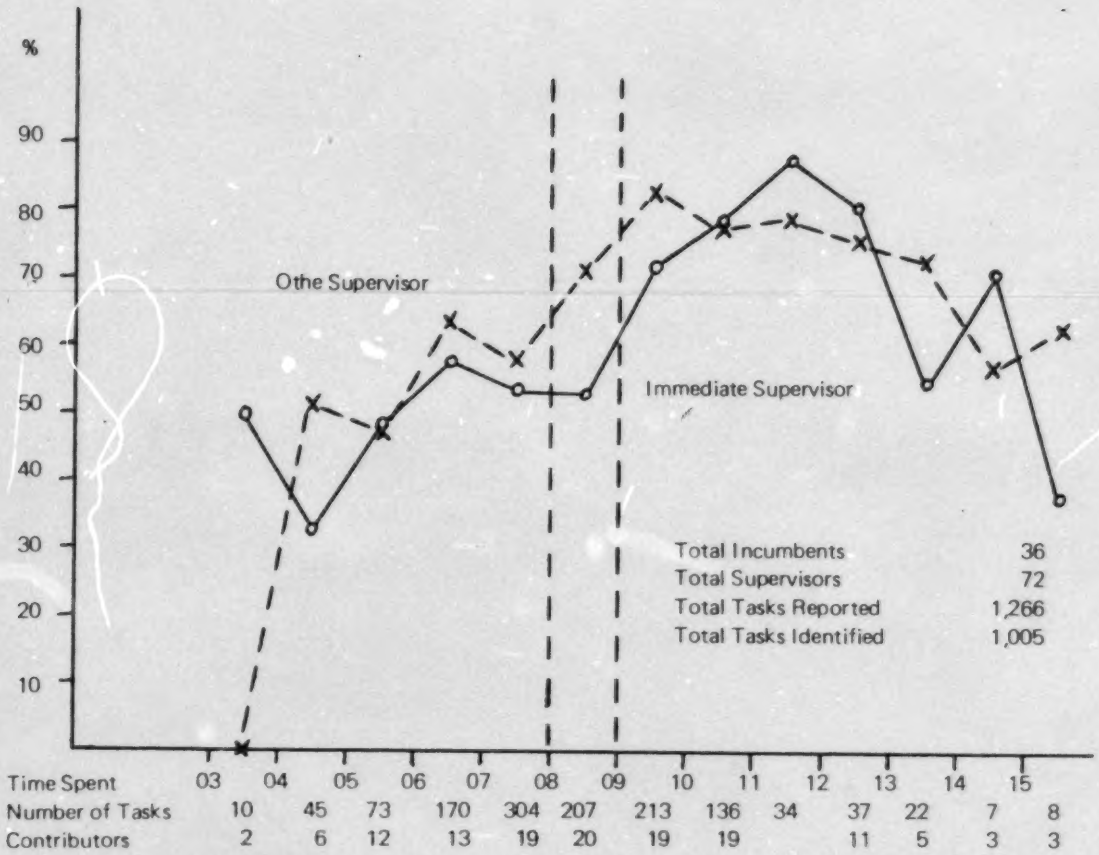

Figure 6. **Percent agreement of supervisors with upper level materiel facilities personnel, 64770 and 64790, on tasks performed.**

Table 5 presents data on the agreement of supervisors with subordinates on tasks indicated as not performed. This should not be thought of as merely the zero point on the time spend scale of Table 3. Although Table 5 is arranged like Table 4, the data are qualitatively different from data on tasks performed. A glance at the number of tasks not performed should be sufficient to see that a high percentage of agreement on nonperformance could occur, despite inaccuracy on the part of the rater. To illustrate this, allow a single incumbent to represent all incumbents. If he reported performance on 20 of the 281 tasks in the inventory, and if a supervisor had rated him on the performance of 10 tasks, all of which were wrong, the data would show that the supervisor was right in 231 of the 261 possibilities. The result would be 89% agreement. The illustration given is an extreme one, applying only to airmen with very few tasks. The more tasks performed, the less chance for agreement.

The four types of agreement (00, 10, 01, 11) remain the same in Table 5 as in the preceding tables, but logical interpretations of these tallies may be different. The *00* column, or both supervisors rated incumbents on the performance of tasks that were not claimed, is of interest. As indicated above, a single supervisor could "agree" with an incumbent on the nonperformance of tasks as a probability function of the number of tasks in the inventory; however, the combined disagreement of two supervisors is a less likely occurrence. Table 5 shows this type of disagreement to be from 5% to 6% for the lower level airmen, and from 7% to 10% for upper level incumbents. The primary observation one can make from Table 5 is lack of superiority of one level of supervisor over another, which conforms to the findings made on tasks that were claimed by the incumbents.

IV. CONCLUSIONS AND DISCUSSION

This study shows no systematic or observable difference between immediate supervisors and other supervisors in agreement with their subordinates. That is, immediate and other supervisors rated performance on the same percentage of tasks on which their subordinates had reported time spent.

When cases by skill level were pooled the resulting figures indicated that the more time a subordinate spent on a task the more likely was his supervisor to rate him on it. However, when the data were broken down into skill levels, greater agreement was found for upper skill level incumbent tasks when the data involved 20 or more incumbents. A low level incumbent had to report more time spent on a task to achieve the same level of supervisor agreement. The analyses offered no way of telling whether this was due to supervisor ignorance about lower level airmen, or to a tendency of lower level airmen to claim tasks which supervisors rejected.

The major finding of the study is quite clear – one does not have to limit himself to immediate supervisors in order to find performance raters who know what a subordinate is doing. However, it would be a mistake to generalize from this study alone. For example, the data appeared to follow a consistent slope when 20 or more incumbent inventories contributed a task at a given time spent level. This is suggestive of procedures for specifying the amount of data needed to identify a task reliably; but 20 is not a magic number and the data from this study may not be typical of Air Force airman jobs in general.

The major findings challenge one's credulity. It just doesn't seem logical that anyone could know as much about an airman's job as his immediate supervisor. Before dismissing this belief as disproven it may be well to examine the underlying assumptions.

First, there is the designation "immediate supervisor." When a base personnel office is asked to transmit rating materials to units, as was done in this study, it is likely that the "immediate supervisor" selected would be the person responsible for the airman's official performance report. This supervisor may not necessarily be the most proximate individual. It is suggested that a check list or questionnaire approach could yield a score that would identify the closest supervisor, who might not necessarily carry the title "immediate."

Second, there was the fairly high tally percentage for supervisors of upper level airmen. Why should this occur, when the higher level NCOs had far more tasks? The instructions made it clear that so much time was being asked of the rater that no supervisor could be expected to rate more than one airman. Although some supervisors rated two airmen, it is probable that the units made a special effort to select knowledgeable supervisors. In other words, the other supervisors chosen were really as familiar with subordinate jobs as the supervisors who were "immediate."

Table 5. Supervisor-Incumbent Agreement That Tasks Were Not Performed

Sample	00 "Error" Both Supervisors Marked Tasks Not Marked by Incumbent	10 Agreement Other Supervisor Agreed with Incumbent	01 Agreement Immediate Supervisor Agreed with Incumbent	11 Agreement Both Supervisors Agreed with Incumbent	Total	Number of Incumbents Reporting
Total, both ladders	4,931	6,367	6,176	60,586	78,060	295
Row %	6.32	8.16	7.91	77.61	100.00	
Inventory Management, 645X0	3,024	4,158	3,538	39,969	50,689	191
Row %	5.97	8.20	6.98	78.85	100.00	
Materiel Facilities, 647X0	1,907	2,209	2,638	20,617	27,371	104
Row %	6.99	8.07	9.64	75.32	100.00	
64530 + 64550	1,657	2,638	1,691	26,292	32,278	118
Row %	5.13	8.17	5.24	81.45	100.00	
64570 + 64590	1,367	1,520	1,847	13,677	18,411	73
Row %	7.42	8.26	10.03	74.29	100.00	
64730 + 64750	1,003	1,340	1,247	14,571	18,161	68
Row %	5.52	7.38	6.87	80.23	100.00	
64770 + 64790	904	869	1,391	6,046	9,210	36
Row %	9.82	9.44	15.10	65.65	100.00	

In essence, this study indicates that many supervisors are knowledgeable about their subordinates' jobs and that the designation "immediate supervisor" may not always be what it seems to be.

It was found that in the supply area it is possible to obtain two supervisors who have about equal knowledge on which to base performance ratings of airmen. The finding had direct impact upon analyses concerned with developing performance criteria. If it should turn out that rater equality was limited to DAFSCs 645X0 and 647X0, the finding would have very little general value. However, if later studies should demonstrate that the finding is characteristic of many ladders in the Air Force, the problem of collecting performance data would be lessened. Better data might be collected by identifying the nature and frequency of a supervisor's contacts with his ratee than by merely looking for an "immediate" supervisor.

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